



# Discovery By Chance Science And The Unexpected

**Garvin McCain, Erwin M. Segal**



## **Discovery By Chance Science And The Unexpected:**

Discovery by Chance Mary Batten, 1968 Describes the contributions of ten scientists whose conclusions drawn from observation of unexpected phenomena greatly influenced scientific development      **Model-Based Reasoning in Scientific Discovery** L. Magnani, N.J. Nersessian, Paul Thagard, 2012-12-06 The volume is based on the papers that were presented at the International Conference Model Based Reasoning in Scientific Discovery MBR 98 held at the Collegio Ghislieri University of Pavia Pavia Italy in December 1998 The papers explore how scientific thinking uses models and explanatory reasoning to produce creative changes in theories and concepts The study of diagnostic visual spatial analogical and temporal reasoning has demonstrated that there are many ways of performing intelligent and creative reasoning that cannot be described with the help only of traditional notions of reasoning such as classical logic Traditional accounts of scientific reasoning have restricted the notion of reasoning primarily to deductive and inductive arguments Understanding the contribution of modeling practices to discovery and conceptual change in science requires expanding scientific reasoning to include complex forms of creative reasoning that are not always successful and can lead to incorrect solutions The study of these heuristic ways of reasoning is situated at the crossroads of philosophy artificial intelligence cognitive psychology and logic that is at the heart of cognitive science There are several key ingredients common to the various forms of model based reasoning to be considered in this book The models are intended as interpretations of target physical systems processes phenomena or situations The models are retrieved or constructed on the basis of potentially satisfying salient constraints of the target domain      Unexpected Scientific Flukes Kaia Stonebrook, AI, 2025-03-31 Unexpected Scientific Flukes explores the pivotal role of accidental discoveries in shaping the landscape of science and innovation Challenging the traditional view of scientific progress as solely the result of meticulous planning this book uncovers how chance encounters and unintended outcomes have led to revolutionary breakthroughs For instance the discovery of penicillin a cornerstone of modern medicine arose from a contaminated petri dish highlighting the importance of observation and adaptability in research Similarly the creation of vulcanized rubber occurred when Charles Goodyear accidentally dropped a mixture of rubber and sulfur onto a hot stove The book examines these scientific flukes across various fields including medicine materials science and everyday products It progresses from establishing the concept of accidental discovery to analyzing key examples demonstrating how these flukes have transformed industries and daily life The narrative emphasizes how recognizing and understanding the significance of these unintended findings can foster a more open minded approach to scientific inquiry potentially leading to new avenues of research The book argues that accidental discoveries are not merely anomalies but integral components of the scientific process By drawing upon historical records scientific publications and case studies the author illustrates the lasting impact of these chance encounters on society This approach offers readers a fresh perspective on scientific history emphasizing the importance of serendipity in scientific innovation and advancement      **Scientific and Technological Thinking** Michael E.

Gorman, Ryan D. Tweney, David C. Gooding, Alexandra P. Kincannon, 2004-09-22 At the turn of the 21st century the most valuable commodity in society is knowledge particularly new knowledge that may give a culture company or laboratory an adaptive advantage Knowledge about the cognitive processes that lead to discovery and invention can enhance the probability of making valuable new discoveries and inventions Such knowledge needs to be made widely available to ensure that no particular interest group corners the market on techno scientific creativity Knowledge can also facilitate the development of business strategies and social policies based on a genuine understanding of the creative process Furthermore through an understanding of principles underlying the cognitive processes related to discovery educators can utilize these principles to teach students effective problem solving strategies as part of their education as future scientists This book takes the reader out onto the cutting edge of research in scientific and technological thinking The editors advocate a multiple method approach chapters include detailed case studies of contemporary and historical practices experiments computational simulations and innovative theoretical analyses The editors attempt a provocative synthesis of this work at the end In order to achieve true scientific and technological progress an understanding of the process by which species are transforming the world is needed This book makes an important step in that direction by leading to breakthroughs in the understanding of discovery and invention

**Teaching and Learning about Science** Derek Hodson, 2009-01-01 Findings generated by recent research in science education international debate on the guiding purposes of science education and the nature of scientific and technological literacy official and semi official reports on science education including recommendations from prestigious organizations such as AAAS and UNESCO and concerns expressed by scientists environmentalists and engineers about current science education provision and the continuing low levels of scientific attainment among the general population have led to some radical re thinking of the nature of the science curriculum There has been a marked shift of rhetorical emphasis in the direction of considerations of the nature of science model based reasoning inquiry based learning scientific argumentation and the use of language rich learning experiences reading writing talking to enhance concept acquisition and development These findings arguments and pronouncements seem to point very clearly in the direction of regarding science education as a study of scientific practice This book presents a comprehensive research based account of how such a vision could be assembled into a coherent curriculum and presented to students in ways that are meaningful motivating and successful The author takes what might be described as an anthropological approach in which scientists are studied as a socially economically and politically important community of people This group has its own distinctive language body of knowledge investigative methods history traditions norms and values each of which can be studied explicitly systematically and reflectively This particular approach was chosen for the powerful theoretical overview it provides and for its motivational value especially for students from sociocultural groups currently under served by science education and under represented in science The book which is both timely and important is written for teachers student teachers graduate

students in education teacher educators curriculum developers and those responsible for educational policy It has the potential to impact very substantially on both pre service and inservice science teacher education programmes and to shift school science education practice strongly in the direction currently being advocated by prominent science educators

*Serendipity Science* Samantha Copeland,Wendy Ross,Martin Sand,2023-07-14 This volume brings together for the first time the diverse threads within the growing field of serendipity research to reflect both on the origins of this emerging field within different disciplines as well as its increasing influence as its own field with foundational texts and emerging practices The phenomenon of serendipity has been described in many ways since Horace Walpole initially coined the term in 1754 to categorize those discoveries that happen by both accidents and sagacity This book offers a sampling of perspectives from experts in serendipity research from organizational studies management theory information science and library studies psychology literature computer science social science ethics and the history and philosophy of science Considerations about the importance and role of serendipity are being raised now across science both empirical and theoretical as well as practice from art and innovation to leadership and governance with ever more eyes looking closer at its significance in human history and the likelihood it will play a key while unpredictable role in forming our future Serendipity Science represents an emerging and also important and potentially necessary field of study if we are to deal well as a society with our complex times and uncertain future

**Research in Industry the Basis of Economic Progress** Arthur Percy Morris Fleming,James George Pearce,1922 Encyclopedia of Creativity Mark A. Runco,Steven R. Pritzker,1999 This encyclopaedia provides specific information and guidance for everyone who is searching for a greater understanding the text includes theories of creativity techniques for enhancing creativity and individuals who have contributed to creativity

**Teaching the Pursuit of Science** John H. Woodburn,Ellsworth Scott Obourn,1965 The Popular Science Monthly ,1911 *Today's Medicine Tomorrow's Science* Judith P. Swazey and Karen Reeds, **The Trajectory of Discovery** Mark P. Khurana,2023-04-13 Medical research works in trajectories Scientists and researchers must choose to pursue certain scientific pathways and omit others limited by resources attention and time The trajectory of medical progress is therefore characterized by two crucial characteristics rate and direction These two components form the foundation for this book what are the forces that determine the rate and direction of progress in medicine This book brings together the worlds of scientific policy economics sociology philosophy and innovation to describe why the world of medical research looks the way it does The book also addresses fundamental contemporary issues in medicine how they influence progress and how we might improve medical research going forward The contemporary issues discussed include flawed incentive structures a concentration of power and resources among few actors and disease groups the potential distortionary effects of lobbying by different scientific actors and missing novelty in drug development **Zaria Journal of Educational Studies** ,1989-06

**The Horn Book Magazine** Bertha E. Mahony,Bertha E. Mahony Miller,1969 Vol 2 includes extra number Experimental

schools in England Jan 1926      **Today's Medicine, Tomorrow's Science** Judith P. Swazey, Karen Reeds, 1978      **Popular Science Monthly**, 1911      *Science: Method and Meaning* Samuel Berder Rapport, Helen Wright, 1963 This anthology provides an introductory sampler from the literature of science for the general reader Topics addressed include the scientific method the effects of science and the parallels between science and the humanities      *The Publishers Weekly*, 1969      **The Game of Science** Garvin McCain, Erwin M. Segal, 1988      Seeds of Discovery William Ian Beardmore Beveridge, 1980

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